**Cell Growth & Division Unit Plan: Cristy Langefeld**

Part 1: Textbook Concept list

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| --- | --- | --- | --- |
| Concept | Definitely Include? | Maybe Include? | Don’t Include? |
| Why Cell Division is Important | Yes. This concept is a good way to start off the unit, showing students why the next few weeks of learning about division and growth is necessary. |  |  |
| Ratio of Surface Area to Volume |  |  | No. This concept is important, but I feel it would be used more efficiently in a different unit, covering more in depth components of cells and structures and genetics. |
| Basics about Chromosome Replication | Yes. Chromosomes play a huge role in cell division containing the genetic material needed for reproduction of living things. |  |  |
| The Events of the Cell Cycle | Yes. These help show the students how the cell prepares and undergoes division. |  |  |
| Mitosis | Yes. Knowledge of this is important for understanding cell division. |  |  |
| Cytokinesis | Yes. Explains how the new daughter cells separate after replication. |  |  |
| Internal and External Controls on Cell Division | Yes. I feel that it is important for students to understand how regulators in the cell work to relate it to disease formation. |  |  |
| Uncontrolled Cell Growth and Cancer | Yes. Cell division is a perfect concept to lead into the study of cancer and how cancer cells replicate. |  |  |
| Stem Cells | Yes. This had been a growing topic in modern medicine and is a great lead into diseases and also goes along with cancer. |  |  |

Part II: Illinois Learning Standards Concept List

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| --- | --- | --- | --- | --- |
| Concept | Descriptor | Definitely Include? | Maybe Include? | Don’t Include? |
| Why Cell Division is Important | Stage I 12A 1 | Yes |  |  |
| Ratio of Surface Area to Volume | Stage 11 H1 |  |  | No |
| Basics about Chromosome Replication | Stage I 12A 3 | Yes |  |  |
| The Events of the Cell Cycle | Stage I 12a 2 | Yes |  |  |
| Mitosis | Stage H 12A 2 | Yes |  |  |
| Cytokinesis | Stage I 12A 2 | Yes |  |  |
| Internal and External Controls on Cell Division | Stage I 12A 1 | Yes |  |  |
| Uncontrolled Cell Growth and Cancer | Stage H 12a 2  Stage h 13a 2 | Yes |  |  |
| Stem Cells | Stage 13a 2 | Yes |  |  |

Use the table below to complete part 3 of your Unit Plan Assignment

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Concept | This Unit? | Another Unit? | Leave Out? | Rationale | Related ILS |
| Why Cell Division is Important | Yes. |  |  | This concept is a good way to start off the unit, showing students why the next few weeks of learning about division and growth is necessary. | Stage I 12A 1 |
| Ratio of Surface Area to Volume |  | Yes. |  | This concept is important, but I feel it would be used more efficiently in a different unit, covering more in depth components of cells and structures and genetics. | Stage 11 H1 |
| Basics about Chromosome Replication | Yes. |  |  | Chromosomes play a huge role in cell division containing the genetic material needed for reproduction of living things. | Stage I 12A 3 |
| The Events of the Cell Cycle | Yes. |  |  | These help show the students how the cell prepares and undergoes division. | Stage I 12a 2 |
| Mitosis | Yes. |  |  | Knowledge of this is important for understanding cell division. | Stage H 12A 2 |
| Cytokinesis | Yes. |  |  | Explains how the new daughter cells separate after replication. | Stage I 12A 2 |
| Internal and External Controls on Cell Division | Yes. |  |  | I feel that it is important for students to understand how regulators in the cell work to relate it to disease formation. | Stage I 12A 1 |
| Uncontrolled Cell Growth and Cancer | Yes. |  |  | Cell division is a perfect concept to lead into the study of cancer and how cancer cells replicate. | Stage H 12a 2  Stage h 13a 2 |
| Stem Cells | Yes. |  |  | This had been a growing topic in modern medicine and is a great lead into diseases and also goes along with cancer. | Stage 13a 2 |

Use the table below to complete parts 4 & 5 of your Unit Plan Assignment.

|  |  |
| --- | --- |
| Concept | Objective(s) |
| 1. Importance of Cell Division | -List reasons cell division is important for life |
| 2. Chromosome Replication | -Understand why chromosomes replicate  -Know the basics of the replication process |
| 3. Events of Cell Cycle | -List and identify G1, S phase, G2, and M phase  -Understand which events occur at each phase (cell growth, DNA replication, preparation for mitosis, mitosis) |
| 4.Mitosis & Cytokinesis | -Identify and describe the stages of mitosis  -Analyze the importance of each stage  -Understand how the cell undergoes cytokinesis and its importance in cell division  -Discuss the differences in cytokinesis with different cell types |
| 5.Internal & External Controls on Cell Division | -Understand the different internal and external controls  -Discuss how the regulators act in the cell |
| 6. Uncontrolled Cell Growth and Cancer | -Define cancer and types of tumors (benign and cancerous)  -Understand major known causes of cancer |
| 7. Stem Cells | -Define stem cell  -Understand how stem cells grow and why they are important in the medical world |

Use the table below to complete part 6 of your Unit Plan Assignment.

|  |  |  |  |
| --- | --- | --- | --- |
| Objective | Possible Teaching Strategies | Final Choice | Rationale |
| List reasons cell division is important for life | 1. notes presented by me from a power point  2. open class discussion on 1st day of unit | #2 | I want the students to think of reasons on their own to start off critical thinking. |
| Understand why chromosomes replicate | 1. power point notes with video clip and class discussion  2. worksheet with replication picture | #1 | I feel the video clip would really help the students’ understanding and the class discussion helps clarify questions, because the students will be able to hear each other’s thoughts. |
| Know the basics of the replication process | 1. notes in class  2. put students in groups, have them look in book and draw a picture of the replication process, then share and discuss in class with notes | #2 | This would allow the students to work backwards; 1st draw and write the steps and 2nd going over the correct information. |
| List and identify G1, S phase, G2, and M phase | 1. worksheet with a diagram and blanks for student’s to fill in each phase  2. notes in class | #1 | I would have the students do this worksheet for homework, so then the next class we could go over it and discuss the next objective. |
| Analyze the events that occur at each phase (cell growth, DNA replication, preparation for mitosis, mitosis) | 1. notes in class  2. in class activity where students use hands on figures to physically put together the mitotic cycle  3. homework assignment | #2 | I think hands on figures make learning fun and gives them something visual to look at. |
| Identify and describe the stages of mitosis | 1. notes in class  2. worksheet with diagrams  3. in class activity where students are put in small groups representing each stage and compile information about each to share with the class | #3 | I feel this activity will allow the students to interact with each other and by taking notes after each groups presentation will help with knowing the order of each stage. |
| Analyze the importance of each stage | 1. notes in class  2. homework assignment and discuss next day in class | #2 | Having the students complete homework on their own and then discussing the next day clears up any confusion. |
| Understand how the cell undergoes cytokinesis and its importance in cell division | 1. class discussion and notes, followed by a homework assignment | #1 | I think having the students complete a homework assignment such as a worksheet, it will help them remember the information. |
| Discuss the differences in cytokinesis with different cell types | 1. power point notes  2. have students in class use computers to look up how different types of cells undergo cytokinesis | #2 | This incorporates technology and allows students to figure out information on their own. Can work in groups or by themselves. |
| Understand the different internal and external controls | 1. notes in class with diagrams and video clips to show students | #1 | Diagrams and video clips really help with understanding cellular functions |
| Discuss how the regulators act in the cell | 1. class discussion  2. student project  3. power point about certain diseases to show how if the regulators do not work, what can happen | #3 | Incorporating information about diseases helps students make connections about how such a small function can create a horrible disease. |
| Define cancer and types of tumors (benign and cancerous) | 1. power point notes  2. homework assignment | #1 | I feel that having the students take notes on this material is crucial to help their understanding of it. |
| Understand major known causes of cancer | 1. notes in class and homework assignment  2. in class lab activity about types of cancer | #2 | This strategy will incorporate the lab and strategy . |
| Define stem cell and know the structure | 1. power point notes in class  2. have students write their own definition of what they feel a stem cell is and lead into a class discussion | #1 | Since stem cells are an important, but abstract topic, I feel notes are important to help with student’s understanding. |
| Understand how stem cells grow and why they are important in the medical world | 1. notes  2. have students for homework look up a medical article where stem cells were used to help someone with a disease or disorder | #2 | I think this would be a really fun and interesting activity allowing the students to choose their own article and learn something new tying in stem cells and the medical field. |

Use the table below to complete part 7 of your Unit Plan Assignment.

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| --- | --- | --- | --- |
| Objective | Possible Assessment Strategies | Final Choice | Rationale |
| List reasons cell division is important for life | 1. quiz  2. call on several random students at the end of class to tell me a reason why cell division is important | #2 | Although not every student will be called upon, I will be able to see how well the students that do get called upon can answer the question. |
| Understand why chromosomes replicate | 1. in class worksheet  2. quiz | #2 | The quiz will be 2 or 3 short answer questions to show they understood what was taught. |
| Know the basics of the replication process | 1. in class worksheet  2. quiz | #1 | The worksheet will have a diagram for students to fill out. |
| List and identify G1, S phase, G2, and M phase | 1. Have the class as a whole shout out the phases  2. short quiz | #1 | This is quick and the class will show me that they know the material. |
| Analyze the events that occur at each phase (cell growth, DNA replication, preparation for mitosis, mitosis) | 1. in class discussion  2. worksheet | #2 | The in class discussion will allow me to see students answering questions and critical thinking. |
| Identify and describe the stages of mitosis | 1. worksheet in class  2. quiz | #2 | Students will complete a short quiz to show their understanding. |
| Analyze the importance of each stage | 1. project  2. quiz | #1 | A project about a disease will help tie in diseases with the mitotic cycle. |
| Understand how the cell undergoes cytokinesis and its importance in cell division | 1. in class worksheet  2. class discussion | #2 | Discussion will clear up any uncertainty about the information learned. |
| Discuss the differences in cytokinesis with different cell types | 1. in class assignment to write a short summary about a certain cell type’s cytokinesis  2. worksheet  3. drawings of the different cells undergoing cytokinesis | #3 | Having the students draw will help with their understanding. |
| Understand the different internal and external controls | 1. quiz  2. have them write the types of controls on a sheet of paper to hand in before they leave | #2 | This will be a quick way to show they either know or do not know the vocabulary. |
| Discuss how the regulators act in the cell | 1. worksheet  2. have students work in groups and discuss the cell regulators | #2 | I will walk around and listen to make sure all students are on task. This will be an interesting way to see student interactions and how they express their knowledge. |
| Define cancer and types of tumors (benign and cancerous) | 1. quiz  2. worksheet | #1 | A short quiz will show me if the students understand the material. |
| Understand major known causes of cancer | 1. Lab activity about cancer; have students figure out the type of cancer from a serious of questions and situations  2. quiz | #1 | The lab activity will be interesting and something new for the students to do and learn from. Students will turn in their activity to be graded. |
| Define stem cell and know the structure | 1. worksheet  2. students define stem cell as a class and tell me the parts as well | #2 | This will let me know the whole class knows the definition. |
| Understand how stem cells grow and why they are important in the medical world | 1. class discussion about the controversies for using stem cells  2. worksheet | #1 | The discussion will allow me to see participation and have students ask questions. |

Use the table below to complete part 8 of your Unit Plan Assignment.

|  |  |  |
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| Science Laboratory Skill | Related Objective(s)? | Teaching Strategy? |
| The ability to use microscopes to see and identify cells and components. | -Understand why chromosomes replicate  -Know the basics of the replication process  - Identify and describe the stages of mitosis  -Understand how the cell undergoes cytokinesis and its importance in cell division | I will have students use the microscopes to see slides of cells undergoing each stage of mitosis and have them identify chromosomes as well. Students will also see several different types of cells undergoing cytokinesis and be able to see similarities and differences in each. |
| Be able to make their own slides and stain them. | - Identify and describe the stages of mitosis | Students will use onions and stain and create slides to see the different stages of mitosis under the microscope. |

**Unit Plan Overview (Part 9)**

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| --- | --- | --- | --- | --- |
| **Day** | **Objective** | **Teaching Strategy** | **Assessment Strategy** | **Notes** |
| 1 | List reasons cell division is important for life | open class discussion on 1st day of unit | call on several random students at the end of class to tell me a reason why cell division is important | Make sure students are paying attention while each student speaks. |
| 2 | Understand why chromosomes replicate  Know the basics of the replication process | power point notes with video clip  put students in groups, have them draw a picture of the replication | Worksheet to take home for homework that will be graded the following day | Walk around and check pictures while they are drawing to catch any mistakes. |
| 3 | List and identify G1, S phase, G2, and M phase  Analyze the events that occur at each phase (cell growth, DNA replication, preparation for mitosis, mitosis) | worksheet with a diagram and blanks for student’s to fill in each phase  in class activity where students use hands on figures to physically put together the mitotic cycle | Have the class as a whole shout out the phases and give a worksheet | Do not let the classes shouting get out of hand. Make it a quick activity. |
| 4 | Identify and describe the stages of mitosis | in class activity where students are put in small groups representing each stage and compile information about each to share with the class | Students will have a short quiz after groups present | Make sure student’s are taking notes while groups present |
| 5 | Analyze the importance of each stage | Worksheet for homework and discussion in class the next day | Students will be assigned a project about a disease, they will choose one (from a list I make) and will have 3-4 days to complete it | Give students the choice between poster, power point, 5-10 min movie clip, or paper for the project. |
| 6 | Understand how the cell undergoes cytokinesis and its importance in cell division  Discuss the differences in cytokinesis with different cell types | class discussion and notes  have students in class use computers to look up how different types of cells undergo cytokinesis | For homework, students will draw pictures of the different cells participating in cytokinesis | Drawings must be colored and each cell should be labeled.  Remind them about the exam coming up. |

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| --- | --- | --- | --- | --- |
| **Day** | **Objective** | **Teaching Strategy** | **Assessment Strategy** | **Notes** |
| 7 | Understand the different internal and external controls | notes in class with diagrams and video clips to show students | have them write the types of controls on a sheet of paper to hand in before they leave |  |
| 8 | Discuss how the regulators act in the cell | power point about certain diseases to show how if the regulators do not work, what can happen | have students work in groups and discuss the cell regulators | Walk around to make sure students are on task |
| 9 | Define cancer and types of tumors (benign and cancerous) | power point notes | Projects will be due today and then a quiz will be given at the end of class |  |
| 10 | Understand major known causes of cancer | Lab activity about cancer; have students in groups figure out the type of cancer from a serious of questions and situations | Turning in their lab activity to be graded | Make sure all groups finish before class ends |
| 11 | Define stem cell and know the structure  Understand how stem cells grow and why they are important in the medical world | power point notes and discussion about the controversies of using stem cells | students define stem cell as a class and tell me the parts as well  class discussion | Remind them about the exam coming up |
| 12 |  | Review Game for Exam |  |  |
| 13 |  |  | Unit Exam! |  |

Use the table below to complete part 10 of your Unit Plan Assignment.

|  |  |  |  |
| --- | --- | --- | --- |
| Units Preceding This One | Reasoning | Unit Following This One | Reasoning |
| Ecology:  - Organism relationships  -Energy flow in ecosystems  -Populations | There are not many concepts to learn before the Cell, because it is a common beginning topic for Freshman Biology. Ecology helps students understand ecosystems as a whole and how organisms are classified. Also, allows students to get an overview of living things which will prepare them for what living things are composed of and how they grow. | Genetics | The students will go into this Unit knowing the basics of cellular division and chromosomes and genetics will cover in more detail the parts and functions of genetic material and their importance in the cell. |